LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY
UNDERGROUND STORAGE TANK DIVISION
GUIDELINES FOR GROUNDWATER MONITORING AT PETROLEUM HYDROCARBON-IMPACTED SITES

INTRODUCTION

Thousands of sites in Louisiana have been impacted by releases of petroleum hydrocarbons into the environment. In response, many of these sites undergo investigation to determine the areal extent of impact. The goal of these investigations is to provide a three-dimensional determination of the extent of hydrocarbon contamination in all affected media.

If groundwater impact is identified, monitoring wells are usually installed to provide for the measurement and corrective action of non-aqueous phase liquids and dissolved petroleum constituents. Historically, sampling of these wells is conducted on a quarterly basis until contaminant concentrations have been reduced to levels protective of public health and the environment and the Department makes a decision that no further action is necessary. At many sites, quarterly sampling continues for years with little environmental benefit while expending significant financial resources.

In order to provide for the most cost-effective management of petroleum-impacted sites, the Louisiana Department of Environmental Quality Underground Storage Tank Division (LDEQ-USTD) has developed these guidelines for groundwater monitoring. By modifying monitoring requirements, the overall cost can be reduced without adversely affecting corrective action efforts. Post-corrective action monitoring will be used to verify that all constituents of concern (COC) have been reduced to appropriate levels. The primary focus of this guidance is to reduce the frequency of groundwater monitoring in monitoring wells where COC have been established to be below applicable standards and to use TPH mixture data as an indicator of the effectiveness of corrective action in lieu of PAH and fractionation data. Following is a description of the rationale and protocols to be followed at petroleum-impacted UST sites.

GROUNDWATER MONITORING OF PETROLEUM-IMPACTED WELLS

The requirements for groundwater monitoring are included in the LDEQ's Risk Evaluation/Corrective Action Program regulations, Appendix B, section B.2.5.11 and Appendix D, Table D-1. Appendix B directs that monitoring begin in all wells at sites where COC have been detected beginning the first quarter after the completion of the investigation and continuing until this requirement is modified or terminated by the Department. Appendix D addresses sampling requirements for the various types of petroleum products.

Sampling to Identify Baseline COC Concentrations

Following completion of the investigation, all monitoring wells, unless otherwise specified by the Department, must be sampled for four consecutive quarters to establish the seasonal range of COC concentrations, unless all COC in soil and groundwater are measured at concentrations less than their approved remediation standard, in which case the site is a candidate for No Further Action-At This Time (NFA-ATT). Once this seasonal range of COC concentrations is established, (within the four consecutive quarters), considerable savings can be realized by discontinuing quarterly sampling without any detriment to human health and the environment. Therefore, unless sensitive receptors are present, quarterly monitoring should not continue beyond four consecutive quarters of data being collected on an individual well until such time as corrective action is initiated. Although it is not expected that a significant amount of time would elapse between investigation completion and initiation of corrective action, monitoring will typically take place in the interim on an annual basis once the four consecutive quarters of baseline data has been collected.

In most cases, for this short period of time, annual sampling is adequate to monitor COC conditions over time in wells where the seasonal range has been established and it is not expected that the contaminant plume is migrating in the direction of a sensitive receptor. If there is a concern regarding sensitive receptors or contaminant migration, the Department, after review of the monitoring data, shall direct monitoring at a schedule deemed appropriate to ensure protection of human health and the environment. .

During the establishment of baseline conditions, groundwater monitoring reports should be submitted to the Department semi-annually. Thereafter, reporting will be on an annual basis until such time as corrective action is initiated.

Sampling During Corrective Action

Groundwater sampling during corrective action, including Monitored Natural Attenuation (MNA), is used to track remedial progress. Once corrective action has been initiated, key monitoring wells may be scheduled for quarterly sampling to verify the effectiveness of the corrective action. Other monitoring wells may be scheduled for less frequent sampling. At the discretion of the Department, any key monitoring well that has yielded analytical results less than the site remedial standard for four consecutive quarters will be considered for less frequent sampling. However, monitoring wells that have been placed on a less frequent sampling schedule should continue to be qauged quarterly to track potentiometric conditions if other wells are being sampled during the quarter. Sites impacted by kerosene/jet fuel, diesel/light fuel oils, heavy fuel oils, crude oil, and used motor/lubricating oils must be sampled for the indicator constituent polycyclic aromatic hydrocarbons (PAHs - Table D-1) and may also address hydrocarbon mixtures through fraction analysis. In keeping with the policy to allow cost-effective management, the Department has determined that analysis of the appropriate hydrocarbon mixture (TPH-DRO, TPH-GRO, or TPH-ORO) may be substituted for PAH and/or fraction analysis during the corrective action /MNA phase unless otherwise specified. Mixture analysis is

much less costly while still providing the ability to track contaminant reduction over time.

Once corrective action has reduced groundwater mixture concentrations to levels indicative of adequate PAH or fraction reduction, PAH and/or fraction analysis should be resumed. If adequate reduction of PAHs or fractions is confirmed, post-corrective action /MNA verification monitoring should begin. If PAHs or fractions are present at concentrations exceeding remedial standards, corrective action /MNA and mixture monitoring must continue.

Groundwater monitoring results should be reported to the Department semi-annually during the Corrective Action period unless otherwise specified by the agency.

Post-Corrective Action Verification Monitoring

Post-Corrective Action (including MNA) verification monitoring consists of groundwater analysis for four consecutive quarters following the cessation of corrective action, or for MNA, for four consecutive quarters after all COC in all wells have been measured at levels equal to or less than their approved remediation standard. The purpose of post-corrective action/MNA monitoring is to verify that all groundwater COC have been permanently reduced. During this period, all COC concentrations must remain at or below their approved remediation standard.

All wells that contained COC concentrations in excess of their approved remediation standard at the initiation of corrective action or MNA must be sampled quarterly during post-corrective action verification monitoring for the appropriate COC, unless otherwise specified by the Department. If COC included PAHs and/or fractions, that analysis must be provided.

All wells previously approved for reduced sampling status may continue on the reduced sampling schedule. However, all wells must be sampled during the last quarter prior to a request for NFA-ATT.

If COC concentrations rebound above their approved remediation standard, the corrective action /MNA period resumes until COC are reduced and permanent reduction is verified through another four consecutive quarter period. When COC in all wells have remained at or below their approved remediation standard for four consecutive quarters, the decision to recommend NFA-ATT should be considered.

Groundwater monitoring results should be reported to the Department semi-annually during the Post-Corrective Action verification period unless otherwise specified by the agency.

CONCLUSION

Monitoring well sampling represents a significant cost at sites where groundwater has been impacted by the release of petroleum hydrocarbons. Reduced or modified sampling can correspondingly reduce cost without adversely affecting the ability to provide site corrective action and protection of human health and the environment. The LDEQ is adopting this policy to ensure that cost-effective corrective action of petroleum hydrocarbon-impacted sites takes place while ensuring protection of human health and the environment.